

WHAT IS CLAIMED IS:

5.6A, >
1. An image reader for optically reading an image on a medium by means of manual operations comprising:

a housing having an image reading surface coming in contact with the medium when reading an image;

a medium detecting unit provided on the image reading surface for detecting the medium; and

an image reading unit provided on said housing for reading image information of the medium according to a result of detection by said medium detecting unit.

2. An image reader according to Claim 1; wherein said medium detecting unit is a mechanical switch for detecting the medium by mechanically contacting the medium.

3. An image reader according to Claim 1; wherein said medium detecting unit is an optical switch for detecting the medium optically.

4. An image reader according to Claim 3; wherein said optical switching unit comprises a light emitting unit for emitting light, and a light receiving unit provided near said light emitting unit for detecting the medium according to a quantity of received light.

5. An image reader according to Claim 1 comprising:
a roller rotatably provided on the image reading surface
of said housing; and
at least one auxiliary roller rotatably provided on the
5 image reading surface of said housing.

6. An image reader according to Claim 5: wherein a rotary
encoder is provided to the axis of said roller for detecting the
rotation thereof.

7. An image reader according to Claim 5: wherein the diameter
of said auxiliary roller is less than the diameter of said roller.

8. An image reader according to Claim 1 comprising:
15 a read control unit for recognizing start and end of image
reading according to a result of detection by said medium
detecting unit and controlling said image reading unit according
to a result of recognition.

20 9. An image reader according to Claim 8 comprising:
an interface unit with an auxiliary image reader capable
of reading a document having a different reading size connectable
thereto; wherein said read control unit processes a result of
reading by said auxiliary image reader when said auxiliary image
25 reader is connected to said interface unit.

10. An image reader according to Claim 8 comprising:
a power supply unit for intermittently supplying power to
said medium detecting unit when the image is not being read
according to a result of recognition by said read control unit.

5

11. An image reader according to Claim 1 comprising:
a memory for storing the data corresponding to a plurality
of images read by said image reading unit as image data.

10 12. An image reader according to Claim 11 comprising:
a communicating unit working as a communication interface
between said memory and an external device with said external
device capable of accessing said memory connectable thereto.

15 13. An image reader according to Claim 11 comprising:
a transmitting unit with an external device connectable
thereto for transmitting a result of reading by said image reading
unit as image data to said external device.

20 14. An image reader according to Claim 1 comprising:
a display unit provided on an operating surface of said
housing for displaying an image according to a result of reading
by said image reading unit.

25

15. An image reader according to Claim 14; wherein said display unit is provided in a vertical posture with respect to a reading surface of said image reading unit.

5 16. An image reader according to Claim 14 comprising:
an angle adjusting unit for freely adjusting an angle of a display surface of said display unit.

10 17. An image reader according to Claim 14 comprising:
a protection cover for covering said display unit.

15 18. An image reader according to Claim 14 comprising:
an operating section provided near one edge of the operating surface of said housing and used for an inputting operation.

20 19. An image reader according to Claim 14 comprising:
a instructing unit for indicating a direction when an image is to be displayed on the display of said display unit; and
a display control unit for controlling the displaying direction of the image on said display unit according to contents of an instruction from said instructing unit.

25 20. An image reader according to Claim 14 comprising:
a display control unit for dividing an image displayed by

said display unit with a ratio of N:M ($N+M=1$) and displaying each of the divided images with a different contraction ratio or enlargement ratio.

5 21. An image reader according to Claim 14 comprising:

a display control unit for displaying a whole or a portion of an image with the same, contracted or enlarged size as compared to the size of the original image displayed by said display unit by overlapping on the other image(s).

10

22. An image reader according to Claim 14 comprising:

a display control unit for displaying in an array of a plurality of entire images or a portion of the image with the same, contracted or enlarged size as compared to the original size of the image displayed by said display unit.

15

23. An image reader according to Claim 14 comprising:

a display control unit for displaying an arbitrary area of a document image with an enlarged or a contracted size as compared to the original size of the image displayed by said display unit.

20

24. An image reader according to Claim 14 comprising:

a display control unit for displaying in an array of images displayed by said display unit which images are rotated or

25

inverted in a plurality of directions;

a selecting unit for selecting any one image from the displayed rotated or inverted images; and

a right posture correcting unit for converting the orientation of the read image according to the orientation of the image selected by said selecting unit.

25. An image reader according to Claim 14 comprising:

a text portion determining unit for determining a text portion of the image;

a rotation direction detecting unit for detecting a direction of rotation of an image from a character image for the text portion determined by said text portion determining unit; and

a display control unit for displaying the image as a properly oriented image on the display of said display unit according to a result of detection by said rotation direction detecting unit.

26. An image reader according to Claim 14 comprising:

a classifying unit for classifying a plurality of images read by said image reading unit according to prespecified items for classification;

a selecting unit for selecting any of the items for classification; and

a display control unit for displaying the images

corresponding to the item for classification selected by said selecting unit.

27. An image reader according to Claim 14 comprising:

5 a digitizing unit for digitizing a read image by generating a threshold value for digitizing according to the read image by said image reading unit.

10 28. An image reader according to Claim 14; wherein, when reading an image, an action point of grasping fingers is at a position lower than a center of gravity of said image reader and at the same time a height of the action point is smaller than a width of said housing.

15 29. An image reader for optically reading an image on a medium by means of manual operations comprising:

a housing having an image reading surface coming in contact with the medium when reading an image;

20 a displacement detecting unit for detecting a displacement of said housing; and

an image reading unit provided on said housing for reading image information of the medium according to a result of detection by said displacement detecting unit.

30. An image reader according to Claim 29; wherein said displacement detecting unit comprises a roller rotatably provided on the image reading surface of said housing, and a displacement computing section for computing a displacement of
5 said housing from the rotation of said roller.

31. An image reader according to Claim 30 comprising:
first and second auxiliary rollers rotatably provided on the image reading surface of said housing so that said first and
10 second auxiliary rollers hold said roller therebetween.

32. An image reader according to Claim 30 comprising:
a read control unit for recognizing start and end of image read according to a result of detection by the displacement
15 detecting unit and controlling said image reading unit according to a result of recognition.

33. An image reader according to Claim 32 comprising:
an interface unit with various types of auxiliary image
20 reader each having a different reading size connectable thereto;
wherein said read control unit processes a result of reading by said auxiliary image reader when said auxiliary image reader is connected to said interface unit.

34. An image reader according to Claim 32 comprising:
a power supply unit for intermittently supplying power to
said displacement detecting unit when an image is not being read
according to a result of recognition by said read control unit.

5

35. An image reader according to Claim 29 comprising:
a memory for storing the data corresponding to a plurality
of images read by said image reading unit as image data.

10

36. An image reader according to Claim 32 comprising:
a communicating unit working as a communication interface
between said memory and an external device with said external
device capable of accessing said memory connectable thereto.

15

37. An image reader according to Claim 31 comprising:
a transmitting unit with an external device connectable
thereto for transmitting a result of reading by said image reading
unit as image data to said external device.

20

38. An image reader according to Claim 29 comprising:
a display unit provided on an operating surface of said
housing for displaying an image according to a result of reading
by said image reading unit.

25

39. An image reader according to Claim 38; wherein said display unit is provided in a vertical posture with respect to a reading surface of said image reading unit.

5 40. An image reader according to Claim 38 comprising:
an angle adjusting unit for freely adjusting an angle of a display surface of said display unit.

10 41. An image reader according to Claim 38 comprising:
a protection cover for covering said display unit.

15 42. An image reader according Claim 38 comprising:
an operating section provided near one edge of the operating surface of said housing and used for an inputting operation.

20 43. An image reader according to Claim 38 comprising:
a instructing unit for indicating a direction when an image is to be displayed on the display of said display unit; and
a display control unit for controlling the displaying direction of the image on said display unit according to contents of an instruction from said instructing unit.

44. An image reader according to Claim 38 comprising:

a display control unit for dividing an image displayed by said display unit with a ratio of N:M ($N+M=1$) and displaying each of the divided images with a different contraction ratio or enlargement ratio.

45. An image reader according to Claim 38 comprising:

a display control unit for displaying a whole or a portion of an image with the same, contracted or enlarged size as compared to the size of the original image displayed by said display unit by overlapping on the other image(s).

46. An image reader according to Claim 38 comprising:

a display control unit for displaying in an array of a plurality of entire images or a portion of the image with the same, contracted or enlarged size as compared to the original size of the image displayed by said display unit.

47. An image reader according to Claim 38 comprising:

a display control unit for displaying an arbitrary area of a document image with an enlarged or a contracted size as compared to the original size of the image displayed by said display unit.

48. An image reader according to Claim 38 comprising:

a display control unit for displaying in an array of images displayed by said display unit which images are rotated or inverted in a plurality of directions;

5 a selecting unit for selecting any one image from the displayed rotated or inverted images; and

a right posture correcting unit for converting the orientation of the read image according to the orientation of the image selected by said selecting unit.

10

49. An image reader according to Claim 38 comprising:

a text portion determining unit for determining a text portion of the image;

a rotation direction detecting unit for detecting a
15 direction of rotation of an image from a character image for the text portion determined by said text portion determining unit; and

a display control unit for displaying the image as a properly oriented image on the display of said display unit
20 according to a result of detection by said rotation direction detecting unit.

50. An image reader according to Claim 38 comprising:

a classifying unit for classifying a plurality of images
25 read by said image reading unit according to prespecified items

for classification;

a selecting unit for selecting any of the items for classification; and

a display control unit for displaying the images
5 corresponding to the item for classification selected by said selecting unit.

51. An image reader according to Claim 29 comprising:

a digitizing unit for digitizing a result of reading by
10 generating a threshold value for digitizing according to a result of reading by said image reading unit.

52. An image reader according to Claim 29; wherein, when
reading an image, an action point of grasping fingers is at a
15 position lower than a center of gravity of said image reader and at the same time a height of the action point is smaller than a width of said housing.

53. An image reader for optically reading an image on a medium
20 by means of manual operations comprising:

a housing having an image reading surface coming in contact with the medium when reading an image;

a medium detecting unit provided on the image reading surface for detecting the medium;

25 a displacement detecting unit for detecting a displacement

of said housing; and

an image reading unit provided on said housing for reading image information of the medium according to both a result of detection by said medium detecting unit and a result of detection by said displacement detecting unit.

54. An image reader according to Claim 53; wherein said medium detecting unit is a mechanical switch for detecting the medium by mechanically contacting the medium.

55. An image reader according to Claim 53; wherein said medium detecting unit is an optical switch for detecting the medium optically.

56. An image reader according to Claim 55; wherein said optical switch comprises a light emitting unit for emitting light, and a light receiving unit provided near said light emitting unit for detecting the medium according to a quantity of the received light.

57. An image reader according to Claim 53; wherein said displacement detecting unit comprises a roller rotatably provided on the image reading surface of said housing, and a displacement computing section for computing a displacement of said housing from the rotation of said roller.

58. An image reader according to Claim 57 comprising:
first and second auxiliary rollers rotatably provided on
the image reading surface of said housing so that said first and
second auxiliary rollers hold said roller therebetween.

5

59. An image reader according to Claim 53 comprising:
a read control unit for recognizing start and end of reading
of an image according to both a result of detection by said medium
detecting unit and a result of detection by said displacement
detecting unit and controlling said image reading unit according
to the result of recognition.

10

60. An image reader according to Claim 59 comprising:
an interface unit with various types of auxiliary image
readers each having a different reading size connectable thereto;
wherein said image control unit processes a result of reading
by said auxiliary image reader when said auxiliary image reader
is connected to said interface unit.

15

61. An image reader according to Claim 59 comprising:
a power supply unit for intermittently supplying power to
said medium detecting unit as well as to said displacement
detecting unit when an image is not being read.

20

25

62. An image reader according to Claim 53 comprising:
a memory for storing the data corresponding to a plurality
of images read by said image reading unit as image data.

5 63. An image reader according to Claim 62 comprising:
a communicating unit working as a communication interface
between said memory and an external device with said external
device capable of accessing said memory connectable thereto.

10 64. An image reader according to Claim 62 comprising:
a transmitting unit with an external device connectable
thereto for transmitting a result of reading by said image reading
unit as image data to said external device.

15 65. An image reader according to Claim 53 comprising:
a display unit provided on an operating surface of said
housing for displaying an image according to a result of reading
by said image reading unit.

20 66. An image reader according to Claim 65; wherein said display
unit is provided in a vertical posture with respect to a reading
surface of said image reading unit.

67. An image reader according to Claim 65 comprising:
an angle adjusting unit for freely adjusting an angle of
a display surface of said display unit.

5 68. An image reader according to Claim 65 comprising:
a protection cover for covering said display unit.

69. An image reader according to Claim 65 comprising:
an operating section provided near one edge of the
10 operating surface of said housing and used for an inputting
operation.

70. An image reader according to Claim 65 comprising:
a instructing unit for indicating a direction when an image
15 is to be displayed on the display of said display unit; and
a display control unit for controlling the displaying
direction of the image on said display unit according to contents
of an instruction from said instructing unit.

20 71. An image reader according to Claim 65 comprising:
a display control unit for dividing an image displayed by
said display unit with a ratio of N:M ($N+M=1$) and displaying each
of the divided images with a different contraction ratio or
enlargement ratio.

25

72. An image reader according to Claim 65 comprising:

a display control unit for displaying a whole or a portion of an image with the same, contracted or enlarged size as compared to the size of the original image displayed by said display unit by overlapping on the other image(s).

73. An image reader according to Claim 65 comprising:

a display control unit for displaying in an array of a plurality of entire images or a portion of the image with the same, contracted or enlarged size as compared to the original size of the image displayed by said display unit.

74. An image reader according to Claim 65 comprising:

a display control unit for displaying an arbitrary area of a document image with an enlarged or a contracted size as compared to the original size of the image displayed by said display unit.

75. An image reader according to Claim 65 comprising:

a display control unit for displaying in an array of images displayed by said display unit which images are rotated or inverted in a plurality of directions;

a selecting unit for selecting any one image from the displayed rotated or inverted images; and

a right posture correcting unit for converting the

orientation of the read image according to the orientation of the image selected by said selecting unit.

76. An image reader according to Claim 65 comprising:

5 a text portion determining unit for determining a test portion of the image;

a rotation direction detecting unit for detecting a direction of rotation of an image from a character image for the text portion determined by said text portion determining unit;

10 and

a display control unit for displaying the image as a properly oriented image on the display of said display unit according to a result of detection by said rotation direction detecting unit.

15 77. An image reader according to Claim 65 comprising:

a classifying unit for classifying a plurality of images read by said image reading unit according to prespecified items for classification;

20 a selecting unit for selecting any of the items for classification; and

a display control unit for displaying the images corresponding to the item for classification selected by said selecting unit.

78. An image reader according to Claim 53 comprising:

a digitizing unit for digitizing a result of reading by generating a threshold value for digitizing according to a result of reading by said image reading unit.

5

79. An image reader according to Claim 53; wherein, when reading an image, an action point of grasping fingers is at a position lower than a center of gravity of said image reader and at the same time a height of the action point is smaller than a width of said housing.

10

80. An image reader for optically reading an image on a medium by means of manual operations comprising:

a medium detecting unit for detecting the medium;

an image reading unit for reading an image on the medium;

a displacement detecting unit for detecting a relative displacement between said image reading unit and the medium; and

a controller for starting reading of an image on a medium when said medium detecting unit detects the medium as well as said displacement detecting unit detects a relative displacement between said image reading unit and the medium.

15

20

81. An image reader for optically reading an image on a medium by means of manual operations comprising:

a reading unit for optically reading the image according

25

to prespecified conditions for reading;

a read start detecting unit for detecting start of reading of image on the medium; and

a read condition deciding unit for deciding the conditions for reading when start of reading of the image is detected by said read start detecting unit.

82. An image reader according to Claim 81; wherein said read start detecting unit detects start of reading of the image by checking whether the medium is present or not.

83. An image reader according to Claim 81; wherein said read start detecting unit detects start of reading of the image by detecting a displacement of the medium.

84. An image reader according to Claim 81; wherein said read start detecting unit detects start of reading of the image by detecting presence of the medium and a displacement thereof on the medium.

85. An image reader according to Claim 83; wherein said read start detecting unit invalidates a result of detection of start of reading of the image when the displacement is less than a prespecified threshold value.

86. An image reader according to Claim 83; wherein said read start detecting unit invalidates a result of detection of start of reading of the image when the displacement is less than a prespecified threshold value.

5

87. An image reader according to Claim 84; wherein said read start detecting unit invalidates a result of detection of start of reading of the image when the displacement detected within a prespecified period of time is less than a prespecified threshold value.

10

88. An image reader according to Claim 84; wherein said read start detecting unit invalidates a result of detection of start of reading of the image when the displacement detected within a prespecified period of time is less than a prespecified threshold value.

15

89. An image reader for optically reading an image on a medium by means of manual operations comprising:

20

a read instructing unit for instructing start and end of reading of the image;

an image reading unit for reading the image;

an image memory for storing a plurality of image data; and

a read control unit for making said image reading unit start

25

reading of an image and also making said image memory store the

image data therein.

90. An image reader according to Claim 89; wherein said image
memory stores the image data read by said image reading unit and
5 reads the stored image data concurrently.

91. An image reader according to Claim 89; wherein said read
control unit restores control for enabling acceptance of an
instruction for start of a next operation for reading immediately
10 after an instruction for end of reading is received from said
read instructing unit.

92. An image reader according to Claim 89; wherein said read
instructing unit instructs start and end of reading according
15 to detection of the medium.

93. An image reader for optically reading an image on a medium
by means of manual operations comprising:

a housing having an image reading unit coming in contact
20 with the medium when reading an image;

a medium detecting unit provided on an image reading
surface of said housing for detecting the medium;

a control processing unit for providing controls over said
medium detecting unit so that detection of the medium can normally
25 be performed according to environments and conditions for reading

an image and processing a result of detection by said image detecting unit; and

an image reading unit for reading image information of the medium according to the result of detection processed by said control processing unit.

94. An image reader according to Claim 93; wherein said medium detecting unit comprises a light emitting element and a light receiving element each for optically detecting the medium, and said control processing unit decides whether said medium detecting unit is to be used or not according to environment and conditions for reading an image.

95. An image reader according to Claim 93; wherein said medium detecting unit comprises a light emitting element and a light receiving element each for optically detecting the medium, and said control processing unit controls power supply to said light emitting element according to terms and conditions for reading an image.

96. An image reader according to Claim 93; wherein said medium detecting unit comprises a light emitting element and a light receiving element each for optically detecting the medium, and said control processing unit provides pulse drive control for said light emitting element.

97. An image reader according to Claim 94; wherein there are provided a plurality of said medium detecting units, said control processing unit determines that the medium has been detected when any one of said plurality of medium detecting units detects the medium, and said image reading unit reads image information of the medium according to a result of detection by said control processing unit.

98. An image reader according to Claim 94; wherein there are provided a plurality of said image detecting units and said image reader comprises a changing unit for freely changing a method of using a result of detection by said plurality of medium detecting units in said control processing unit.

99. An image reader according to Claim 93; wherein said medium detecting unit consists of a photoelectric switch for detecting the medium optically or a mechanical switch for detecting the medium mechanically.

100. An image reader according to Claim 99; wherein said control processing unit determines that the medium has been detected when any one of said photoelectric switch or said mechanical switch detects the medium.

101. An image reader according to Claim 99 comprising:

a priority deciding unit for deciding and giving preference to any one of the result of detection by said photoelectric switch or said mechanical switch in order to execute the control processing in said control processing unit.

102. An image reader according to Claim 93; wherein said medium detecting unit detects the medium optically and a wall is provided around said medium detecting unit.

103. An image reader according to Claim 93; wherein said medium detecting unit consists of a plurality of mechanical switches each for discretely detecting the medium mechanically, said control processing unit determines that the medium has been detected when any one of said plurality of mechanical switches detects the medium, and said image reading unit reads image information of the medium according to a result of detection by said control processing unit.

104. An image reader according to Claim 103 comprising:

a changing unit for freely changing a control method in said control processing unit by using a result of detection in each of said plurality of mechanical switches.

105. An image reader according to Claim 93; wherein said medium detecting unit comprises:

a moving member including a main roller rotating on the medium when reading an image and capable of freely moving in said

5 housing; and

a movement detecting unit for detecting movement of said moving member.